Monitored dosage systems: a waste of time, or a formula to enhance patient outcomes?

Mark Stone, Pharmacist
Tamar Valley Health, Cornwall
Monitored Dosage Systems: a waste of time, or a solution to enhance patient outcomes?

Mark Stone
Practice Clinical Pharmacist
Tamar Valley Health (Practices)
• Stroke death at 2 years 3.81 (95% CI: 2.85 – 5.10) times higher odds and 10 years 3.01 (95% CI: 2.37 – 3.83) when compared with the adherent patients

• Stroke hospitalization was at 2 years 2.74 (95% CI: 2.35 – 3.20) and 10 years 1.71 (95% CI: 1.49 – 1.96) when compared with the adherent patients
• **Poor control of HbA1c** (>7% or >53mmol/mol) was seen with 77.6% of poor adherers, whereas only 26.7% of high adherers had poor control

• **Good control of HbA1c** (<7% or <53mmol/mol) was seen with 22.4% of poor adherers, whereas 73.7% of high adherers had good control
“Why asthma still kills”

The National Review of Asthma Deaths (NRAD)

Royal College of Physicians May 2014
NRAD Report: Findings

• The review found that many of the patients who died had excessively used their reliever inhalers in the months running up to their deaths
• 38% of those people who died had fewer than four ICS inhalers in the previous 12 months.
• 75% of those who died did not have a personalised asthma plan which would have told them what to do in the event of an asthma attack
• 43% of those who died had no evidence that an asthma review had taken place in general practice in the last year before death
• 58% of those who died were being treated for mild or moderate asthma at the time
The avoidable costs in healthcare

Exhibit 1: Avoidable U.S. healthcare costs add up to $213 billion

Avoidable Costs in U.S. Healthcare. June 2013. IMS Institute for Healthcare Informatics
Medicines Adherence

The avoidable costs in healthcare

Adherence Costs In England

• Total medicines that are destroyed as waste
  – £300 million p/a (£150 million unavoidable)
• Cost of incorrect and inadequate medicines use
  Total achievable saving £500 million p/a
  – asthma £130 million (£2,250 compliant patient)
  – diabetes £100 million (£440 compliant patient)
  – hypertension £100-£390 million (£1,413)
  – statins CVD (1º & 2º) £66-£130 million (£780)
  – schizophrenia £133-190 million (£3,350)
What exactly is 'adherence'?

Adherence:
The extent to which a patient takes their medicines as prescribed by their health care professional

Poor adherence is generally defined as: Following the prescribed medication regime less than 80% of the time
WHO 2003 -

“that increasing the effectiveness of adherence interventions may have far greater impact on health of the population than any other improvement in specific medical treatments”
# Medicines Adherence

## The Reasons For Non-Adherence

<table>
<thead>
<tr>
<th>Reason For Non-adherence</th>
<th>Examples of issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heath System</strong></td>
<td>Poor patient prescriber relationship, poor communication between patient and prescriber, lack of continuity of care</td>
</tr>
<tr>
<td><strong>Disease/Condition</strong></td>
<td>Long term treatment, asymptomatic chronic disease, mental health disorders e.g. depression</td>
</tr>
<tr>
<td><strong>Patient</strong></td>
<td>Patient beliefs, behavioural, cognitive impairment, physical impairments, age</td>
</tr>
<tr>
<td><strong>Therapy</strong></td>
<td>Complexity of medicines regime, side effects</td>
</tr>
<tr>
<td><strong>Socioeconomic</strong></td>
<td>Low literacy, poor social support, cost of treatment</td>
</tr>
</tbody>
</table>

# Medicines Adherence

## Ways to enhance patient adherence

<table>
<thead>
<tr>
<th>Reason For Non-adherence</th>
<th>Non-adherence issues</th>
<th>Interventions to improve adherence</th>
</tr>
</thead>
</table>
| **Heath System**         | • Poor patient prescriber relationship  
                           • Poor communication between patient & prescriber  
                           • Lack of continuity of care | Shared decision making  
                           Patient decision aids, prescriber training  
                           Transition of care medicines support |
| **Disease/Condition**    | • Long term chronic disease  
                           • Mental health disorders e.g. Depression | Educational support  
                           Case management, integrated care |
| **Patient**              | • Patient beliefs  
                           • Cognitive impairment  
                           • Physical impairments | Behavioural & educational support (face to face/telephone counselling e.g. NMS), self-management (asthma plan)  
                           Reminders e.g. medicines reminder charts, SMS, Multi Compartment Compliance Aid (MCCA), large print labels  
                           Winged shaped bottle caps, large print labels |
Medicines Adherence

Ways to enhance patient adherence

<table>
<thead>
<tr>
<th>Reason For Non-adherence</th>
<th>Non-adherence issues</th>
<th>Interventions to improve adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapy</td>
<td>• Complexity of medicines regime</td>
<td>Rationalise therapy regimes, medication reminder sheet, Multi compartment Compliance Aid (MCCA)</td>
</tr>
<tr>
<td></td>
<td>• Side effects</td>
<td>Case management</td>
</tr>
<tr>
<td>Socio-economic</td>
<td>• Low literacy</td>
<td>Educational support</td>
</tr>
<tr>
<td></td>
<td>• Poor social support</td>
<td>Case management</td>
</tr>
<tr>
<td></td>
<td>• Cost of treatment</td>
<td>Co-payment</td>
</tr>
</tbody>
</table>

Multi compartment Compliance Aid (MCCA)

Improving patient outcomes: The better use of multi-compartment compliance aids

“The use of multi-compartment compliance aids (MCA) has become regarded as a panacea for medicines use and that they should not automatically be the intervention of choice for all patients.”

Royal Pharmaceutical Society July 2013
Multi compartment Compliance Aid (MCCA)

Improving patient outcomes: The better use of multi-compartment compliance aids

“Although MCA may be of value to help some patients with problems managing their medicines and maintaining independent healthy living, they are not the best intervention for all patients and many alternative interventions are available. The evidence-base indicates that MCA should not automatically be the intervention of choice for all patients”

Royal Pharmaceutical Society July 2013
Multi compartment Compliance Aid (MCCA)

Reminder packaging for improving adherence to self administered long-term medications (Review)

“We found that reminder packaging increased the proportion of people taking their medications when measured by pill count; however, this effect was not large. We also found some evidence that reminder packaging may be beneficial in improving clinical outcomes such as blood pressure and blood glucose.”

Mahtani KR et al Cochrane Database of Systematic Reviews 2011, Issue 9
Multi compartment Compliance Aid (MCCA)

Reminder packaging for improving adherence to self administered long-term medications (Review)

• Reminder packaging increased the percentage of pills taken (mean difference (MD) 11% (95% (CI 6% to 17%)).

• We found that reminder packaging significantly decreased diastolic blood pressure (MD = -5.89 mmHg (95% CI -6.70 to -5.09; P < 0.00001; I²= 0%)

• We found that reminder packaging significantly reduced glycated haemoglobin levels (MD -0.72; 95% CI -0.83 to -0.60; P < 0.00001; I²= 92%)
# Compliance Aid Service

## Appendix 2: Patient Assessment for Medicines Compliance Support

This assessment tool should be used whenever a patient presents with a compliance problem with their prescribed medication, or when there is a suggestion that an MDS may be appropriate. This should NOT be used for patients who were using such a device prior to admission.

### Patient details

- Name
- Hospital No.
- Address
- NHS number

### GP details

- GP Name
- GP Practice
- Tel no

### Ward

**Step 2 What can the patient manage?**

<table>
<thead>
<tr>
<th>Physical</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Swallowing</td>
<td>Swallow all their tablets/capsules?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Open and close child-resistant lids?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Open and close screw lids?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Open medicine boxes &amp; Blister Strips?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Halve tablets themselves (if required)?</td>
<td>Yes</td>
</tr>
<tr>
<td>Vision</td>
<td>Read standard print labels?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Read large print labels?</td>
<td>Yes</td>
</tr>
<tr>
<td>Understanding</td>
<td>Understand each medicine dosage instruction?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Understand the importance of each medicine?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>How to take PRN medication?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>How to take variable doses (e.g. warfarin)?</td>
<td>Yes</td>
</tr>
<tr>
<td>Memory</td>
<td>Remember to take their medication regularly?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Remember to order their repeat medication?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Is aware of the time of day reliably?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

If the answer to each question is yes, it is unlikely the patient requires compliance support. Go to Step 4.

If the answer to any question is no, proceed to the suggested adjustments listed in Step 2.

### Step 3 Which adjustments might be appropriate? continued

Examples of suggested adjustments are included below:

<table>
<thead>
<tr>
<th>Problem</th>
<th>Suggested solutions</th>
<th>Action plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swallowing</td>
<td>Provide liquid formulations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide soluble formulations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simplify regime to once daily combination preps</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refer to recommendations made by Speech &amp; Language therapy</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Problem</th>
<th>Suggested solutions</th>
<th>Action plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexterity</td>
<td>Provide screw/wing lids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide large bottles/bottles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dispense blister packed medicines into bottles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide halved tablets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relative/carer administers all medication</td>
<td></td>
</tr>
<tr>
<td>Vision</td>
<td>Provide large print labels</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relative/carer administers all medication</td>
<td></td>
</tr>
<tr>
<td>Understanding</td>
<td>Provide a Medicine Reminder Card</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medicines Use Review</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relative/carer administers all medication</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>Provide a Medicines Reminder Sheet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simplify medication regime</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relative/carer administers all medication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organise repeat prescription collection/delivery service</td>
<td></td>
</tr>
</tbody>
</table>

If a suitable adjustment can be made, proceed to Step 4.

If none of the suggested adjustments are made, proceed to Step 3.

### Step 4 Is a MDS (‘blister pack’) compliance aid appropriate?

- Can patient open and close the blister pack?
- Can patient select medication correctly? (Suggest test with day of week and time)
- Can patient remove medication from the box?
- Is patient willing to change current medication system?
- Is a Community Pharmacist prepared to supply compliance aid boxes?

If yes, state who: **Tei no:**

- Will the CP deliver the MDS?
- If yes, state which day(s): MON TUE WED THU FRI SAT SUN
- If no, specify who will collect the pack:
- Is a carer requesting an MDS device?
- If yes, have they received any training to administer medicines from their Care Agency?

If the answer to each question is yes, a compliance aid box might be a suitable adjustment.

### Step 5 Assessor details

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

**Outcome of assessment:**

- It is my opinion that this patient does not have a medicines compliance problem
- It is my opinion that this patient does have a medicines compliance problem and would benefit from the following adjustments:
MCCA: Assessing The Medication

Not all medicines can be used in a dose administration aid. Medicines may not be suitable if they:

- deteriorate when removed from the manufacturer’s packaging e.g. effervescent, dispersible, buccal and sublingual preparations
- degrade when exposed to light e.g. frusemide, nifedipine
- absorb moisture from the air when removed from packaging e.g. sodium valproate, (es) omeprazole
- have special administration instructions e.g. alendronate
- have special handling requirements e.g. cytotoxic medicines, finasteride
- are taken ‘when required’ or in variable doses e.g. warfarin
- are not available in a solid oral dose form
MCCA: Assessing The Medication

Data for the stability of medicines outside of their original packaging.

The UK Medicines Information (UKMi) executive is developing an open access, web accessible, searchable database to provide information and guidance about the stability of solid dosage forms of medicines stored outside of their original packaging. This database is expected to be ready in late 2014 and will include medicines listed within the British National Formulary.

UKMi website for details
http://www.ukmi.nhs.uk/default.asp
## Compliance Aid Service

### MCCA: Assessing The Medication

**UKMi website for details**

http://www.ukmi.nhs.uk/default.asp

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Trade Name</th>
<th>Manufacturer</th>
<th>Form</th>
<th>Theoretical Concerns</th>
<th>UKMi Recommendation</th>
<th>Notes</th>
<th>Review Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dabigatran etexilate</td>
<td>Pradaxa</td>
<td>Boehringer Ingelheim</td>
<td>Capsules 75mg, 110mg, 150mg</td>
<td>Very sensitive to moisture so should be left in individual foil wrapping.</td>
<td>R2</td>
<td>Unsuitable.</td>
<td>15/03/2013</td>
</tr>
<tr>
<td>Metformin</td>
<td>Glucophage</td>
<td>Merck Serono</td>
<td>Tablets 500mg, 850mg Tablets s/r 500mg, 750mg, 1000mg</td>
<td>Protect from light.</td>
<td>A3</td>
<td>Protect from light.</td>
<td>15/11/2012</td>
</tr>
<tr>
<td>Omeprazole</td>
<td>Losec</td>
<td>AstraZeneca UK Ltd</td>
<td>Capsules g/r 10mg, 20mg, 40mg</td>
<td>Protect from light and moisture. Degrades at high humidity. Maximum 2 weeks in MCA.</td>
<td>A1</td>
<td>Protect from light. Protect from moisture.</td>
<td>14/02/2013</td>
</tr>
<tr>
<td>Ramipril</td>
<td>generic</td>
<td>Accord HealthCare Ltd</td>
<td>Capsules 1.25mg, 2.5mg, 5mg, 10mg</td>
<td>Protect from light and store in airtight containers.</td>
<td>A3</td>
<td>Protect from light. Airtight container.</td>
<td>15/03/2013</td>
</tr>
</tbody>
</table>
MCCA: Which type on device?

1) Blister type e.g. Manrex lever file medicines holder
   i. Cold seal
   ii. Simple but laborious assembly

2) Multi-dose cassette type e.g. NOMAD, Venalink, MTS
   i. A weeks medicines contained in one cassette
   ii. Complexity of assembly (inc risk errors)

3) Carousel type dosage system e.g. Pivotel
   i. Electronic reminder
   ii. Reduced risk of overdosing

4) Liquid unit dose cassettes e.g. Biodose
   i. Photos of residents
MCCA: Dispensing process

1. Dedicated area for assembly, reduce interruptions and errors

2. Produce a standard operating procedure for dispensing
   i. Formalised process to deal with changes of medicine regimes (re-use?)
   ii. When required dosing

3. Assessment risk/benefit and stability and suitability of medicines for MCCA
   i. Controlled drugs (storage, record keeping)

4. Labelling: name, practice address, drug name (strength, form), drug appearance (to identify medicines), dosage directions, date of dispensing
5. Provision of patient information leaflets (PILs). PILs have been a legal requirement in the UK since 1999 for all medicines and should be issued with each prescription.

6. Record keeping of dispensing

7. Training of dispensing staff to check complex MCCA assembly (recommend e.g. Accredited Checking Technician)

8. Storage of assembled MCCA e.g. light and temperature, 6-8 weeks maximum

9. Monitoring of patient compliance, collection of unused medicines
MCCA: The Business Case

Benefits

Patient:
• Can help improve patient adherence to medicines
• Enhance positive therapeutic outcomes for patient

NHS:
• Provides a system that can be monitored for adherence levels
• May reduce unnecessary unscheduled admissions to hospital
• May reduce medicines waste through reduction of stock hoarding

Dispensing Business:
• Enhances service offering to patients, reduces loss to other dispensers
• Can increase item fee revenue
MCCA: The Business Case

Risks

Patient:
• Can cause confusion with medicines regime, e.g. when required, other forms
• Patients can de-skill and become reliant on compliance aids

NHS:
• May increase reliance on NHS services by reducing confidence to self-care
• Additional workload for GPs, pharmacists, dispensers and social care staff

Dispensing Business:
• Increases complexity and labour time of dispensing assembly
• No formalised payment mechanism
MCCA: The Funding Question

Equality Act 2010 (Disability Discrimination Act 95 & 05)

- It requires equal treatment in access to employment as well as private and public services, regardless of the protected characteristics of age, disability...

- Acts place a duty on service providers and required "reasonable adjustments" to be made when providing access to goods, facilities, services and premises

- Is a monitored dosage system a reasonable adjustment?
MCCA: The Funding Question

Short Prescription Intervals

• “The NHS Terms of Service do not impose a requirement to dispense into compliance aids or to dispense in instalment”. PSNC
• “Doctors provide prescriptions for intervals that they feel are clinically appropriate, taking into account such factors as possible reactions, a possible need for a change in prescription and consequent waste of NHS resources, patient compliance, and any necessary monitoring”. GPC May 2013
• “Positive opportunities for the further reduction of medicines waste includes: encouraging the flexible and informed use of 28 day (prescribing)” Waste Medicines, York Health Economics.
MCCA: The Funding Question

The Future Of Funding


Recommendations included that:

• England moves to a single, ring-fenced budget for health and social care, with a single commissioner

• Individuals and their carers would benefit from a much simpler system of health and social care that is designed to reflect changing levels of need

• The commission proposes funding changes, including changes to National Insurance contributions. Increasing the income from prescription charges
MCCA: The Funding Question

The Future Of Funding: Prescription Charges

- 909.9 million items exempt, 94.6% of items in community
- Prescription charges provided £450m in gross revenue in 2012

Recommendations included that:

- Remove the blanket exemption for over 60 years, low income and medical exemptions
- £2.50 per items charge on prescription (items)
- Cap on medicine spend of £104 per year (same as current pre-payment certificate)
What can I do to help your business?

1. Maximising your practice’s dispensing business
2. Increasing your margin, turnover and enhancing competitiveness
3. Supporting you in applying to open a pharmacy

Contact: Mark Stone, Pharmacist Independent Prescriber
mark.stone1@nhs.net